Induced Plant Responses in the *Bemisia tabaci*-Tomato System

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Some plants have constitutive barriers against possible attacks by pests or pathogens, and plant resistance is an alternative tool to environmentally toxic insecticides in integrated control. In addition, plants can activate protective mechanisms upon contact with a previous invader. This interesting phenomenon is termed induced or acquired resistance and often protects the plant against a second invasion by the same or another pest or pathogen. On the contrary, the induced responses in the plant could not be necessarily negative to a subsequent invader and could produce beneficial effects to these organisms. It is known that some biological agents such as certain bacteria and fungi can induce plant resistance to other pathogens. However, few investigations have been done to date to evaluate host plant induced responses to piercing-sucking insects in susceptible plants from horticultural crops.

Recently, we have demonstrated that plant resistance to whitefly *Bemisia tabaci* was induced in susceptible tomato plants after infestation by the potato aphid *Macrosiphum euphorbiae*, but not at the reverse. Now, we present preliminary results from a study to investigate whether plant resistance to *B. tabaci* (B biotype) could be induced in susceptible tomato plants (cv. Marmande) by a previous infestation with the same insect pest or, on the contrary, whether responses elicited in the plant would enhance suitability to this whitefly species.

MATERIAL AND METHODS

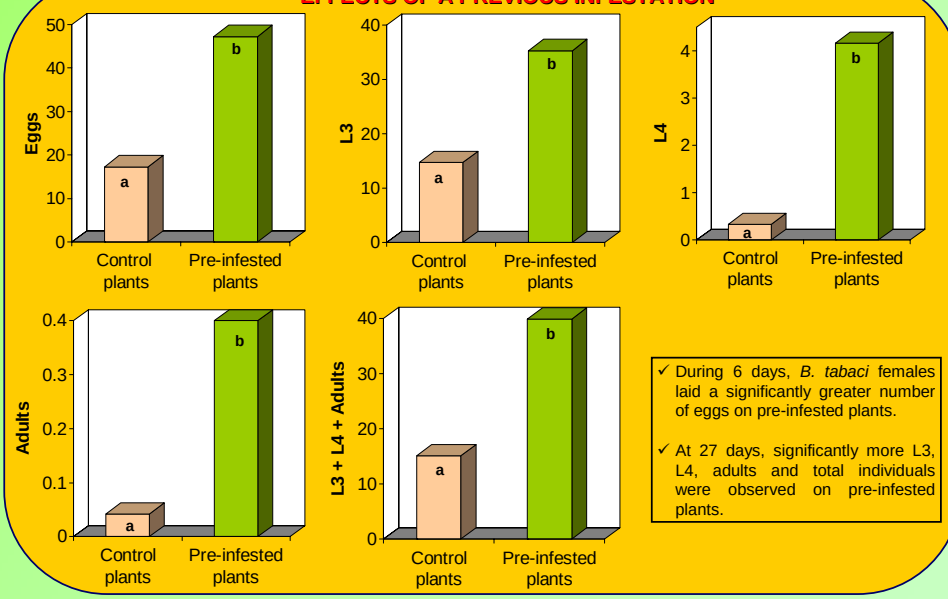
Effects of a previous infestation and influence of plant age:

- Climate chamber conditions: 24ºC, L16:D8, 60% R.H.
- No-choice assay with 80 tomato plants (cv. Marmande).
- Two plant ages: 25- and 53-day-old.
- Each of 20 young and 20 old plants infested with 10 adult males (*B. tabaci*, B biotype) confined to a clip-cage attached to one leaflet.
- Other 40 plants (control) with empty clip-cages.
- Males and clip-cages removed after 3 days.
- One day latter, every pre-infested or control plant re-infested with 5 female whiteflies confined to a clip-cage.
- After 6 days, females and clip-cages removed and eggs laid on every plant counted.
- At day 27th, L3, L4 and adult (empty pupal cases) whiteflies counted.
- Data log10 (x+1) transformed before comparison by ANOVA and Tuckey HSD test for unequal N.

Local or systemic effect?:

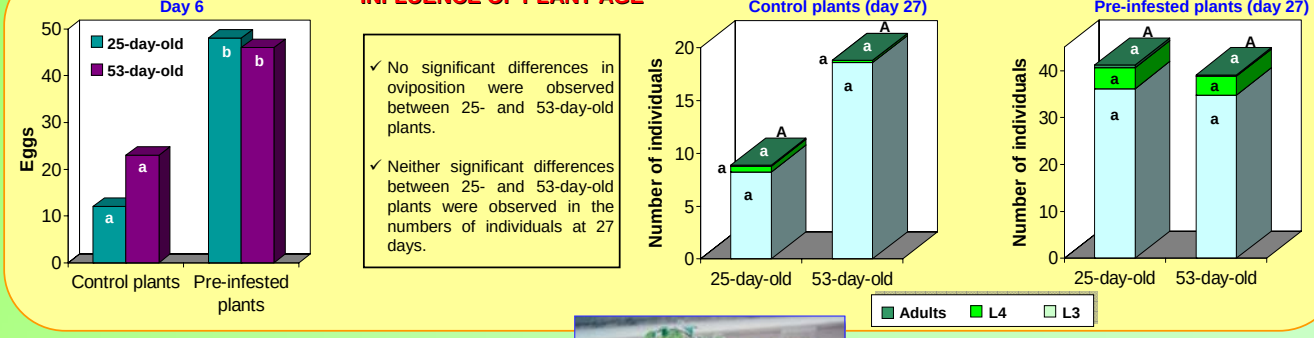
- Similar experimental conditions and methodology.
- 53-day-old tomato plants.
- 14 plants pre-infested with 10 male whiteflies during 3 days, and 14 un-infested (control) plants.
- One day latter, second infestation: 5 female whiteflies confined to each of 2 clip-cages attached to the pre-infested (or pre-caged) leaflet, and to another leaflet of the upper contiguous leaf, respectively.

EFFECTS OF A PREVIOUS INFESTATION



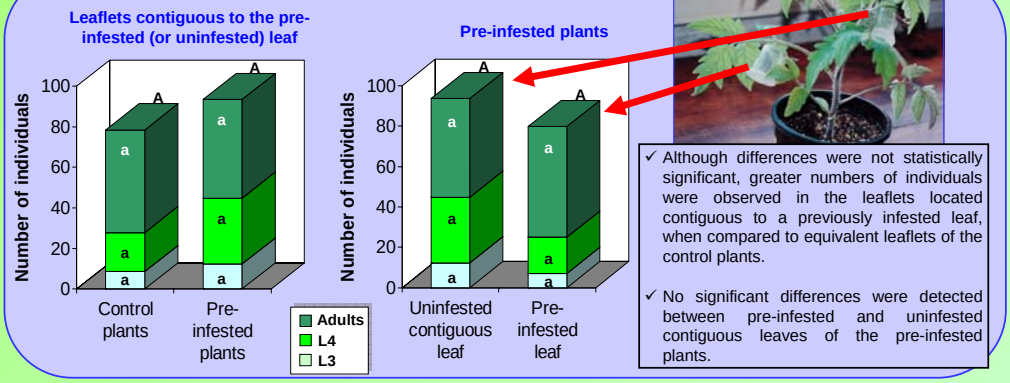
- ✓ During 6 days, *B. tabaci* females laid a significantly greater number of eggs on pre-infested plants.
- ✓ At 27 days, significantly more L3, L4, adults and total individuals were observed on pre-infested plants.

INFLUENCE OF PLANT AGE



- ✓ No significant differences in oviposition were observed between 25- and 53-day-old plants.
- ✓ Neither significant differences between 25- and 53-day-old plants were observed in the numbers of individuals at 27 days.

LOCAL OR SYSTEMIC EFFECT ?



- ✓ Although differences were not statistically significant, greater numbers of individuals were observed in the leaflets located contiguous to a previously infested leaf, when compared to equivalent leaflets of the control plants.
- ✓ No significant differences were detected between pre-infested and uninfested contiguous leaves of the pre-infested plants.

CONCLUSIONS

- ✓ **Three days of whitefly feeding induced an increase of the tomato susceptibility to a second infestation by *B. tabaci*.**
- ✓ **This induction was independent of the plant age, with similar effects on young and old plants.**
- ✓ **The plant response was both local and systemically induced.**

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